HARDWARE QUANTUM GATE

Abstract of the Disclosure

A hardware quantum gate for running quantum algorithms in a very fast manner exploits the fact that a large number of multiplications required by an entanglement operation of the quantum algorithm provides a null result since only one component per row of the entanglement matrix U_F is not a null. The entanglement operation generates an entanglement vector by permuting pairs of opposite components of a linear superposition vector, depending on the value assumed by the function f. More specifically, if function f is null in correspondence to the vector identified by the first (leftmost) n qubits in common with the two $n+1$ qubit vectors, in which a pair of opposite components of the superposition vector is referred to, then the corresponding pair of components of the entanglement vector is equal to that of the superposition vector, otherwise it is the opposite.